IS 6687 (2002): Code of Practice for Selection, Storage, Installation and Maintenance of Conveyor Belting [PGD 31: Bolts, Nuts and Fasteners Accessories]

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भारतीय मानक

वाहक पट्टों के चयन, भंडारण, संस्थापन तथा रख-रखाव की रीति संहिता

(पहला पुनरीक्षण)

Indian Standard

CODE OF PRACTICE FOR SELECTION, STORAGE, INSTALLATION AND MAINTENANCE OF CONVEYOR BELTING

(First Revision)

ICS 53.040.20

BUREAU OF INDIAN STANDARDS
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April 2002

Price Group 6

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Pulleys and Belts Sectional Committee had been approved by the Basic and Production Engineering Division Council.

This standard was first issued in 1972 and the present revision of the standard has been taken up to incorporate the latest developments which have taken place in the field.

This revision covers some additions or revisions in the following requirements:

a) Installation — Installing the belt,
b) Maintenance — Initial run — Unloading section,
c) Common problem encountered and means to overcome them — General cover problems, and
d) Joining the endless belts — Vulcanized splices.

Annex A is informative guide for common problems encountered and means to overcome them.

Indian Standard

CODE OF PRACTICE FOR SELECTION, STORAGE, INSTALLATION AND MAINTENANCE OF CONVEYOR BELTING

(First Revision)

1 SCOPE

This standard lays down the recommendations on selection, storage, installation and maintenance of conveyor belting both in underground and surface applications.

2 REFERENCES

The following Indian Standards contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
1891(Part 1): 1994	Conveyor and elevator textile belting—Specification: Part 1 General purpose belting (*fourth revision*)
4240 : 1984	Glossary of conveyor terms and definitions (*first revision*)
4776 (Part 1): 1977	Troughed belt conveyors: Part 1 Surface installations (*first revision*)
14206	On site non-mechanical jointing of plied textile reinforced rubber conveyor belting—Code of practice:
(Part 1) : 1995	Hot vulcanizing
(Part 2) : 2001	Cold vulcanizing

3 TERMINOLOGY

3.1 For the purpose of this standard, the terms and definitions as given in IS 4240 shall apply.

3.2 A reference shall be made to IS 4776 (Part 1) in regard to take-up devices, drums, skirt plates, idlers, cleaning, lubrication and safety precautions.

3.3 The belting shall consist of a carcass having a cover of either rubber and/or plastics. The carcass shall consist of either one of more plies or of woven fabric or of solid woven fabric and shall be impregnated with a rubber of plastic mix. The whole shall be either vulcanized or fused together in a uniform manner.

A belt conveyor in service has an endless belt moving over two terminal pulleys — the drive pulley is generally at the head end or at an intermediate point along the return run. The take-up is usually placed either at the end of the conveyor opposite to the drive or somewhere in the return run. The load is discharged over the head pulley or at any other point along the carrying run by means of a fixed or travelling tripper. Conveyor belts are utilized for handling all pulverized, granular and bulk materials and packages provided the amount to be carried is sufficiently large.

3.3.1 *Types of Belt Conveyors*

For a description of various types of belt conveyors a reference to IS 4240 shall be made.

4 SELECTION OF CONVEYOR BELT

4.1 When selecting a conveyor belt either as a replacement or in a new installation, information as detailed in Annex A of IS 1891 (Part 1) shall be provided to the manufacturer for proper selection. The following important points shall also be carefully considered:

a) The belt shall have adequate width to carry the load specified at a practical speed. The size of lumps influence the selection of width. It is desirable from economical point of view to keep the belt width as narrow as possible and speed as high as possible within accepted limits.

b) Sufficient strength to withstand the maximum working tension to which it will be subjected, as a result of the total power requirements which include:

1) Power required to drive empty belt,
2) Power required to move material horizontally, and
3) Power required to raise material.

c) Adequate thickness and cover grade dependent on the loading cycle and lump size of material to withstand the abrasion, cutting and gauging by the material carried.

In addition to these, the belt shall be adequately flexible to be able to conform to the configuration of the carrying idlers and also to flex over the pulleys. The belt shall also have sufficient body to support the load to avoid material spillage in the unsupported region of belt between the carrying idlers. It is also important to take proper care for selection and design of other conveyor equipment and accessories for proper running of the belt, both when empty and loaded.

4.2 The principal characteristics that are required to be described when specifying conveyor belts are:

Width, strength rating, number of plies, material of carcass, top cover thickness, bottom cover thickness, grade/type of cover, moulded or cut edge, special features, if any and length.

5 CONSTRUCTION

5.1 Length

The length to be ordered is dependent on the requirements of the drive. In case of long length requirements, the users in consultation with the manufacturers, shall determine the maximum length that can be supplied in one roll.

The following formula may be used to estimate the diameter of belting roll:

$$D = \sqrt{1\,290\,LT + C^2}$$

where

D = Diameter of drum, mm;

L = Length of belt, m;

T = Thickness of belt, mm; and

C = Diameter of core box, mm.

6 PACKING

The belting shall be suitably packed as mutually agreed to between the purchaser and the supplier.

7 STORAGE

The belting shall be stored in a cool, dry and well ventilated place away from any harmful environment, such as oil, grease, direct sun light and corroding fumes. The belt-rolls shall be stored vertically and shall never be stored in the open where they may be subjected to weather. It is desirable to rotate the crate from time to time to prevent any spot continually bearing the total weight of the belt. The storage of belting is important, as improper storage could lead to problems in service, such as crooked running, edge damage and premature cover failure.

8 PRE-INSTALLATION CARE

Before installing a new belt, it is important that the following points shall be checked.

8.1 Conveyors

a) The conveyor shall be checked for level and alignment;

b) All spilled material shall be removed prior to installation;

c) Any build up of material on idlers, rollers and drums shall be removed;

d) All moving parts of the conveyor shall be suitably lubricated to ensure easy rotation. Any damaged or seized idlers shall be replaced immediately; and

e) In the case of new conveyors, it is important to ensure that there are no sharp corners in the structure as this would damage the belts during installation.

8.2 Belting

The conveyor belts, prior to installation, require careful handling to ensure that there is no damage. The belts are generally packed in cylindrical crates which may be rolled from place to place. All wooden crates are marked with an arrow showing the direction in which the crate shall be rolled. If the crate is rotated in the opposite direction to that of the arrow, the belt-rolls tend to loosen and to telescope. The crates containing belts shall not be dropped from wagons, trucks or other means of conveyance which may cause damage to the belt.

The crates shall preferably be hoisted. Otherwise, rolled or skidded. For hoisting a roll, a bar is passed through the hole in the center of the roll. Chains or cables looped around the bar shall be provided with a spreader above the roll to avoid damage to the belt edges.

9 INSTALLATION

9.1 Installing the Belt

9.1.1 Once the belt is required for installation on a new conveyor or as a replacement on an existing conveyor, the belting roll or crate shall be brought to site with care marking and sure that it is not dropped or mishandled.

9.1.2 Before mounting, the carry cover and back cover of the roll must be checked and it shall be threaded accordingly. Conveyor belting is normally rolled at the factory with the carrying side out in the roll. Consequently, in mounting the roll the belt must lead off the top of the rod if it is being pulled into the troughing idlers. Under certain conditions it may not be possible to use horizontal shaft for the crate or roll due to limited headroom. In such cases it may become necessary to remove the belting from the drum or unroll and lay it flat in the form of loops.

9.1.3 Extreme care shall be exercised to see that the loops have large bends to avoid kinking or placing undue strain on the belt. No weight shall be placed on the belt when it is so laid. Another method of handling the roll, where headroom for mounting on a horizontal shaft is not enough, is mounting on a turn-able with a vertical spindle. The belt must make a 90° twist as it comes off the turn-able. This method is sometimes used underground with the turn- able mounted on wheels or skids for transporting the roll of belts as it lies on its side as well as for unloading it at the final location.

9.1.4 If the belt is for replacement the new roll may be set up as previously indicated. The old roll is clamped off and cut and the new belt joined to the leading end of the old belt by using approximately half the usual number of plate type fasteners. The trailing end of the old belt is hooked to a suitable towing vehicle, like truck, tractor, movable crane or mine locomotive. The conveyor drive motor is used to pull on the new belt as the towing device connected to the old belt drags it away and at the same time provides sufficient slack side tension for the conveyor drive pulley. Care shall be exercised in all cases that the carrying side of the conveyor is placed upward if pulling on the top run or downward if pulling on to the return run. For a new conveyor installation, having little or no inclination, a rope or cable shall be attached to a clamp at the belt end. In clamping to the end of the belt for pulling it on, it is not sufficient to cut a hole through the belt or into it corners for tying on a rope.

9.1.5 A clamp shall be made to distribute the pull applied to the belt end across its full width. Since the clamp pass through the places of low clearance it is usually made of two pieces of 6 to 12 mm plate approximately equal to the belt width and 100 mm long. One of these is placed against each surface of the belt at the end, and bolts placed through both places at about 150 mm intervals and 50 mm from the belt end. The rope is then attached to this clamp with a shackle or by welding an eye to one of the plates. The rope or cable is then threaded over the conveyor and attached to some suitable towing device to pull the belt on to the conveyor.

9.1.6 For installations with a relatively high degree of slope (12° or more) the method of handling is slightly different. The roll of belt is set up as previously. It is often found most convenient to place it at or near the head pulley as this is generally the most accessible. Assuming the conveyor is sufficiently long to require more than one splice, the carrying side and the return side are threaded on separately. Care must be taken to see that conveyor side or thicker cover is up on the carrying side and down on the return run.

9.1.7 As the belt is fed on, the tension at the roll tends to build up due to the weight of the belt on the slope. For this reason, some method of breaking is required. Customary practice is to use a belt clamp, mounted on the conveyor structure, through which the belt is threaded. Where the slope is very long, additional clamps shall be used, spaced approximately 30 m apart. Where more than one lamp is used, men are stationed at each clamp to loosen and tighten the clamps as the belt is fed on to the conveyor.

9.1.8 If the conveyor side and the return side have been fed on separately the final splice is best made

at the bottom of the slope where the ends of the belt meet since a much lower splicing tension will serve at this point.

9.2 Tensioning the Belt

9.2.1 The amount of tension required in a belt at the time of splicing depends upon the take-up provided, the average running tension in the belt, the point along the conveyor where the splice is being made and whether the belt is tensioned by pulling in one direction only or in both directions. Obviously, if a belt is spliced at the top of a slope, more splicing tension is required than if spliced at the bottom.

9.2.2 The purpose of splicing the belt with a pre-determined tension at the point of splicing is to establish an average tension at the time of splicing equal to the average running tension. Thus, when initially operated there will be no change in belt length and no change in take-up position from that established during the splicing. This ensures that the initial position of the counterweight can be correctly established. Subsequent, changes in belt length due to other load conditions, growth of the belt or occasional, shrinkage of the belt are compensated for by travel of the take-up carriage.

9.2.3 If a conveyor has an amount of take-up equal to that specified in IS 4776 (Part 1), the average running tension for the belt may be computed from the tension existing when the belt is running empty. When take-up is limited, the average tension existing while the conveyor is being run loaded, shall be used.

9.2.4 With a counterweight take-up and adequate take-up travel, the conveyor may be tensioned quite simply. The splice must be made near the counterweight with all the pull in one direction. The other end, between the clamp and the take-up, is tie off. The pull is then made so that it is necessary to pull completely around the conveyor back to the other side of the counterweight. When the counterweight starts lifting, sufficient tension has been applied.

9.2.5 This is equivalent to the average tension when the conveyor is running empty. Such a method has the advantage that no dynamometer is necessary to measure the applied tension, the counterweight itself serving this purpose. When this method is used, the take-up pulley shall be raised to the desired position and the pulley maintain when the conveyor runs empty. Only under these circumstances does the normal counterweight serve as a proper measure of installing tension.

9.3 Joining the Endless Belts

After the belt has been installed on the conveyors the ends shall be joined either by metal fasteners or by vulcanized splices.

9.3.1 *Mechanical Fasteners*

When joining with metal fasteners the following requirements are a must for a good joint :

a) The ends have been cut perfectly square;

b) The right size of fasteners are used in relation to belt thickness and minimum diameter of fasteners are used in relation to belt thickness and minimum diameter of pulleys on the conveyor; and

c) After fitment of the fasteners it is to be ensured that the pin does not extend beyond the edge of the belt by suitably dressing the ends to prevent snagging of the belt structure.

9.3.1.1 If adequate attention to these points is not paid, it would cause operating problems, such as, misaligned running of the belt, failure of the joint and belt damage.

9.3.1.2 Mechanical fasteners are of several types. The most commonly used type for heavy belting is the bolted plate type. This fastener uses a series of plates across the belt, on both top and bottom surfaces, spanning the joint and compressed against and into the belt surface by a countersunk bolt in each end of each plate. This class of fastener makes a strong and durable joint with no gap to leak materials.

9.3.1.3 In addition to the bolted plate type of fasteners there are plate type fasteners attached to the belt by means of split rivets or rivets cast as apart of the plate itself. These type of fasteners have a plate on the upper surface only of the belt. Hook type fasteners attach to the belt ends by means of hook formed from wire or sheet steel. These are applied by forcing the hook through the belt and clinching it on to the opposite side. All these types have a hinged pin or rocker pin joint and can be material and these are generally used in lighter service than the normal type.

9.3.2 *Vulcanized Splices*

Wherever practicable, vulcanized splices shall be used as means of joining the conveyor belting. Vulcanized splices have the following advantages:

a) Less prone to longitudinal tear;

b) A smooth joint, free from clanking impact with pulleys/idlers;

c) Permit use of cleaning devices;

d) More strength in the joint;

e) Better flex life of the joint;

f) Seal the ends of the belt against moisture and fine material thereby increase the belt life;

g) Lower belt cost since in some cases lesser plies may be required to do the job;

h) The vulcanized splices often last the life of the belt and usually do not fail without previous warning; and

j) For belts carrying hot material, no carcass deterioration is caused as in case of metal fasteners.

9.3.2.1 Both hot and cold vulcanized splices are recommended. Users can select either of these depending upon their experience. For detailed procedures the guidance may be taken from IS 14206 (Part 1) and IS 14206 (Part 2).

9.3.2.2 In long conveyor installation, where the number of splices are more than one, it is preferable to make the last joint with mechanical fasteners and run the belt for a few days so that the proper position of the take-up can be ascertained. Then the last joint shall be spliced keeping the take-up pulley at the proper position of the traverse.This procedure may also be applied where take-up travel is inadequate.

NOTE — The splicing of an unused belt length to an old and used belt, strictly speaking, is not recommended since there is no proper 'matching' of the old and new compounds of the belting leading to premature belt failure.

10 POST-INSTALLATION MEASURES— TRAINING OF BELT

10.1 Before running the belt with full load, it is preferable to train the belt after installation and joining of belt ends specially when the conveyor is newly installed. The process of adjustment of idlers, pulleys and loading conditions for correcting belt from crooked running is termed as training of belt. Initially all carrying and return idlers should be aligned. But since the procedure can never be adopted to absolute perfection, it is necessary to train the belt by trimming the idlers both top and return run after observing the behaviour of the belt during running.

10.2 A slight adjustment of snub pulley often helps to train the belt upon entering the return run. If a belt runs normal after training when empty but off-center when loaded, it can be assumed that the defect lies in the method of loading. Off-center loading or loading from the side is the main reason and loading method shall be improved. Sometimes imperfect joining of ends is the cause of crooked running. Care shall be taken so that the joint is at right angles to the belt center line.

11 MAINTENANCE

11.1 Initial Run

Before running the belt with load, it is preferable to check the following points specially when the conveyor belt is being used for the first time.

11.1.1 *Loading Section*

a) Adequate clearance between the belt and the lip of the loading chute so that there is no entrapment of material, as this will cause conveyor and carcass damage.

b) The loading chute shall be of suitable design and inclination to provide free flow of material on to the belt, that is, without jamming so that belt is loaded centrally and at the same speed and direction as the moving belt, keeping in mind, that the height of fall is kept to a minimum. Direct fall of material on belt be avoided as far as possible.

c) When mixture of lumps and fines are handled it is worthwhile considering use of grizzle screen by which the fines present a bed for the heavier lumps and hence minimize impact.

d) Only rubber strips of the correct hardness shall be used as skirt board rubber.

e) The skirt boards shall be so placed that at their commencement they are about two-third of the belt width apart and widen out in the direction of belt travel to provide proper distribution of load. The skirts shall also flare upwards in the running direction of the belt in order to prevent any wedging of material.

f) Whenever heavy large lumps of material are carried the belt shall be supported at the loading point by means of rubber impact idlers closely placed. In service these shall be inspected periodically to ensure that they are operating satisfactorily.

g) Where impact idlers are not being used care shall be taken not to place an ordinary idler below the belt in the direct line of fall of the material as the belt will sustain impact damages due to its getting jammed between the material and idler.

11.1.2 *Unloading Section*

a) The unloading chute shall be so located that adequate clearance is provided to prevent any wedging of material between the lip of the chute and the belt. The clearance between the lip of the chute and face of the pulley shall be more than twice the largest piece of material that is conveyed.

b) When ploughs or scrapers are used for unloading a belt, proper material of strips of rubber are recommended and not the use of old conveyor belt pieces, as these were away the surface of the belt prematurely.

c) Whenever trippers are used to unload material, extra precautions shall be taken to check the level and alignment of tripper car and pulleys.

d) Proper belt cleaning facilities shall be installed before the belt wraps the second tripper pulley as any material stuck to the belt after discharging will be ground between belt and second pulley causing belt wear and damage.

e) Sufficient transition distance be kept between the first carrying idler and the terminal pulleys to avoid over stressing of belt edges.

11.1.3 *Intermediate Section*

a) In case of long conveyors or in reversible conveyors the use of self-aligning idlers is recommended.

b) When moist or sticky materials are being carried helical or rubber disc return idlers should be used.

c) The use of decking between the top and return runs prevents spillage of excess material on to the return run. This is also specially desirable at the loading section.

d) The use of side guide idlers is recommended only for initial running of the belt. Constant use leads to excessive edge wear.

e) Where the material carried is damp and sticky, it is essential to use belt cleaning devices, such as rotating brushes, scrapers or water sprays.

11.1.4 Besides the above it is worthwhile considering the use of pull-cord stop switches along the entire length of the conveyor in case of emergencies.

11.1.5 It is preferable to run the belt empty and carefully examine the belt and structure for the following:

a) Is entire length of the belting running aligned without any rubbing against the structure both on the carrying and return runs?

b) Are all carrying and return idlers rotating freely?

c) Does the belt slip at the head pulley at the time of starting? If so, check the take-up weight and ensure that the correct tension is maintained. Adjustment in take-up weight may have to be done when cotton belts are replaced by synthetic fabric belts.

d) It is preferable to lag the pulleys to avoid slippage and save energy.

11.2 Belt in Operation with Load

Once the belting is put into commission it is essential that a periodic check is maintained on both the belting and the associated equipment. Among the most important points that need attention are:

a) Inspect both top and bottom runs of the belting at least once a fortnight and any damage to edge, covers, etc, shall be attended to by repair immediately.

b) Prepare a programme of periodic checking and lubrication of metal parts, such as driving gear, bearings, idlers, etc. However, excessive lubrication shall be avoided which will cause the belt to come in contact with grease, oil, etc. Worn out and struck up idlers be repaired/replaced immediately.

c) Inspect joint to see if there are any symptoms of failure. If so, these shall be attended to immediately.

d) Check periodically the entire length of the conveyor for accumulated spilled material, build up of material on pulleys and idlers and take suitable measures to clean and minimize them.

e) It is preferable to install magnetic separators to remove tramp iron from the bed of the material as it is discharged from the conveyors.

11.3 Repair

To achieve the lowest unit operating cost, conveyor repair shall be a scheduled maintenance procedure by the user. Cover cuts and edge damage permit the entrance of moisture or foreign materials, thus promoting earlier than usual belt failure. Repairs may be made with repair dough which is self-vulcanizing and temporary in nature or with hot vulcanizing repair material.

11.3.1 Permanent vulcanized repairs may be accomplished during periods of scheduled maintenance where the condition of the belt warrants such repair.

11.3.2 Repair of carcass breaks, if not so serious initially, may be done during periods of scheduled maintenance. Breaks of a serious nature must be repaired immediately after they occur even though it may necessitate an unscheduled shut down of the equipment.

ANNEX A

COMMON PROBLEMS ENCOUNTERED AND MEANS TO OVERCOME THEM

A-1 GENERAL

A-1.1 As a guide for overcoming service problems once the belt is in regular operation common problems encounter, the symptoms, the causes and remedial action necessary are listed below:

Symptom	*Cause*	*Cure*
A. Belt Edges		
1. Edge worn or frayed	Rubbing due to:	
	a) Defective joint	a) Rectify joint.
	b) Misaligned running	b) Check conveyor alignment and re-align belt.
	c) Off-center loading	c) Re-position loading chute to feed load centrally.
	d) Defective self-aligning idler	d) Rectify or replace faulty idler.
	e) Inadequate edge clearance	e) Minimum recommended clearance between belt edge and structure is 75 mm.
	f) Belt too stiff for adequate troughing	f) Install a laterally more flexible belt.
B. Top Cover		
1. Excessive uniform wear	Across the belt width:	
	a) Cover not fully specified or incorrect grade	a) Specify thicker cover of correct grade depending on loading cycle and material carried.
	b) Worn or seized return idlers	b) Install cleaning devices or rubber disc idlers. Check periodically if all idlers rotate freely. Replace seized idlers with new ones.
	c) Spilled material under tail pulley setting up abrasion	c) Increase clearance between tail pulley and floor, fit decking to avoid spillage.
	d) Return run of belt rubbing against spilled material along the conveyor	d) Prevent spillage along the run of the conveyor. Check return idler spacing and belt tension. Ensure all spilled material to be removed immediately.
	e) Load disturbance due to uneven conveyor level and spacing	e) Ensure correct conveyor level and recommended idler spacing
	Narrow central section:	
	Speed is too high thereby belt carries a 'thin' load.	Re-design drive at reduced speed. Check chutes and skirt boards to ensure that the load is fed on to the belt uniformly across its effective width.

Symptom	*Cause*	*Cure*
		At the commencement skirt boards may be placed about two-third of the belt width apart and they shall widen out in direction of travel to ensure uniform load distribution across the width.
2. Grooving or cuts or stripping of cover	a) Material jamming between belt and skirt.	a) Adjust board rubber to provide minimum clearance.
	b) Skirt board rubber too hard and stiff. Use of old belting pieces.	b) Use only plain rubber strips of correct hardness.
	c) Skirt board incorrectly set.	c) Skirt board shall flare up slightly (say 1 in 42) in direction of running of belt to prevent wedging of material between belt and skirt. The metal of wooden skirt board shall under no circumstances come in contact with the belt.
	d) Jamming of material in chute.	d) Re-design and widen chute. In case the jamming is at the loading chute, reduce rate of loading or increase belt speed.
	e) Worn or seized return idler roll.	e) Replace all unserviceable idlers with new one idlers.
	f) Handling of wet, sharp material through tripper pulleys in the absence of proper belt cleaning facilities.	f) Install proper clearing facilities before belt wraps the second tripper pulley.
3. Cover gouging	Impact of heavy lumps:	
	a) Face cover of inadequate thickness.	a) Re-design cover and grade based on loading cycle and size of material carried. Incorporate breaker, if necessary.
	b) No cushion idler at impact section or height of fall too great.	b) Use impact idlers at loading point and install 'Grizzly Screen' to ensure that fines are deposited first on the belt and larger lumps then fall on belt. Reduce the height of fall of material to a minimum.
	c) Roll back of material on incline.	c) Reduce speed, ensure loading on horizontal, avoid if possible, loading large lumps without small material accompanying them.

Symptom	*Cause*	*Cure*
C. Back Cover		
1. Servers cover wear and peeling of cover	a) Slippage of drive pulley, sand thrown between belt and drive pulley.	a) Adjust tension, lag the drive pulley, increase are of contact.
	b) Carrying idlersseized/sticking.	b) Improve maintenance and lubrication replace seized idlers.
	c) Excessive forward tilt of carrying idler.	c) Adjust to not more than 2° from vertical.
	d) Material spillage on to return run of belt which is ground between belt and pulley.	d) Install decking plates or use endless belt. Use scrapers at tail end not old belting pieces shall be used with scrapers or ploughs.
	e) Bolt heads in the case of lagged drums protruding.	e) Tighten bolts. Replace worn lagging.
D. General Cover Problems		
1. Surface cracks all over	Exposure to sunlight or ozone for long periods.	Protect/Cover belt suitably.
2. Cover softening and increase in thickness carrying area	Oil contamination.	Use oil resisting belting.
3. Cover hardening and cracking prematurely in area of material contact	Material carried too hot.	Use correct grade of heat resistant belting.
4. Bulging of cover at places and the same extending along belt length.	Fine material working into cuts or punctures in the ruber cover.	Immediate repair of cuts and punctures to prevent ingress of fine dust, etc.
5. Through holes in belt	Red hot material coming in direct contact of belt.	Quench/Cool material to desired temperature before loading on belt.
E. Belt Carcass		
1. Breaks in the carcass	a) Impact of large heavy material.	a) Use impact idlers. Keep height of fall to a minimum and load in line with the belt at a speed equal to belt speed.
	b) Material entrapment between the belt and pulley.	b) Use scrapers or ploughs at tail and section and proper decking at take-up pulley in case of gravity take-ups.
2. Transverse	a) Belt edges folding up use to misaligned running.	a) Use limit switches to stop excessive running out and investigate reason of runing out
	b) Incorrect transition distance.	b) Re-locate or read just idler or pulley to correct position.

Symptom	*Cause*	*Cure*
	c) Inadequate convex curve.	c) Increase curve radius to correct value.
3. Length-wise carcass break with covers intact	Belt running off-centre and folding over.	Use limit switches and determine reason for running out.
4. Fastener pull out	a) Too much tension.	a) Reduce tension.
	b) Incorrect size of fastener or improper joining.	b) Use correct fasteners.
	c) Direct-on-line starting.	c) Use graduated starting.
5. Transvers breaks immediately behind fasteners	Fasteners plates too long for pulley diameter.	Change to shorter fasteners or increase diameter of pulley.
6. Longitudinal rip partially or through entire belt thickness	a) Belt running off and snagging on structure.	a) Ensure true running.
	b) Tramp iron jamming in structure and ripping belt apart.	b) Re-design chute to prevent jamming. Use metal detector of magnetic separator.
	c) Fasteners working loose jamming in structure and riping belt apart.	c) Use correct fastener and periodically examine joint for rectification.
7. Ply separation	a) Mildew or dust penetration into carcass.	a) Prevent cuts, etc. Arrange for immediate repairs.
	b) Pulley diameters too small.	b) Use pullies of correct diameter.
	c) Oil contamination.	c) Removesource of contamination.
	d) Too many reverse bends.	d) Use more flexible belt.
	e) Edge wear due to rubbing and penetration of moisture and grit.	e) Correct misalignment or remove obstruction.
	f) Remnant chemical of acid/ alkali washed material penetrating through edges.	f) Use chemical resistant type belt in consultation with supplier. Use moulded edge belt.

Bureau of Indian Standards

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Review of Indian Standards

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This Indian Standard has been developed from Doc: No. BP 29 (0079).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

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Printed at Simco Printing Press, Delhi